NT => New Technology

14/01/25

* Unix
- developed by team in 1969.
- kernel
- UNIX Flavours : IBM, HP, UX., SUNSOLARIES.

Linus Torvalds invented his own kernel from scratch.

* LINUX - Case sensitive
- Linus Torvalds : Inventor, 1991
- open source
- 1000 flavours of Linux :
REDHAT, UBUNTU, CENTOS, KALILINUX, DEBIAN... etc
- website for creating OS ---- LINUX FROM SCRATCH ---- own LINUX
- LINUX is a Kernel

* Kernel -
- Heart of Operating System.
- It acts as a middleman bet^n h/w & s/w.

OS - Collection of Combination of kernel, services, Filesystems, Drivers,

① Kernel in Windows OS ?
② Who is the Father of All proggramming lang.?

① Windows NT Kernel

windows OS uses Hybrid kernel, combine functionality of monolithic kernels & microkernels.

# Basic Command

15/01/25

① Folder name in Linux
Directory

② How to make directory
mkdir dir_name

③ How to show list - ls

④ How to create File in Linux (empty File)
touch < file_name >

⑤ How to show properties
ls -l .... l = long listing
ls -l < Filename >

⑥ How to change directory
cd Folder_name

⑦ How to back from directory
cd ..

* In properties
"-" file
"d" directory

⑧ How to open file
cat < Filename >

⑨ How to show history
history

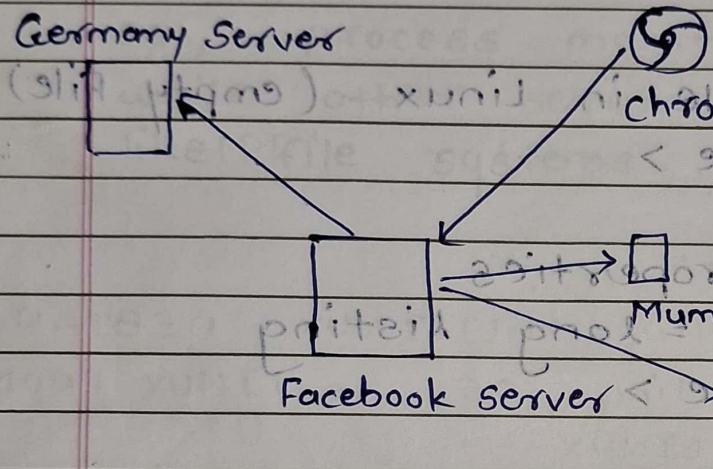
⑩ How to show First 10 lines of a file
head file_name - First 10 lines
tail File_name - Last 10 lines

* CentOS is a mirror copy of Redhat

16/01/25

* Full form of CentOS
Community Enterprises operating System

* CDN - Content Delivery N/W
Reduce delay, Latency




20/01/25

~

- Rooting -
- Top of all the folder or directory
- Father of all directory
- denoted by "/"

① "/" rooting
② ~ User Home
③ Desktop
④ Folder or Files

- How to show File property ?
ls -l File_name

- How to show Folder property ?
ls -ld Folder_name

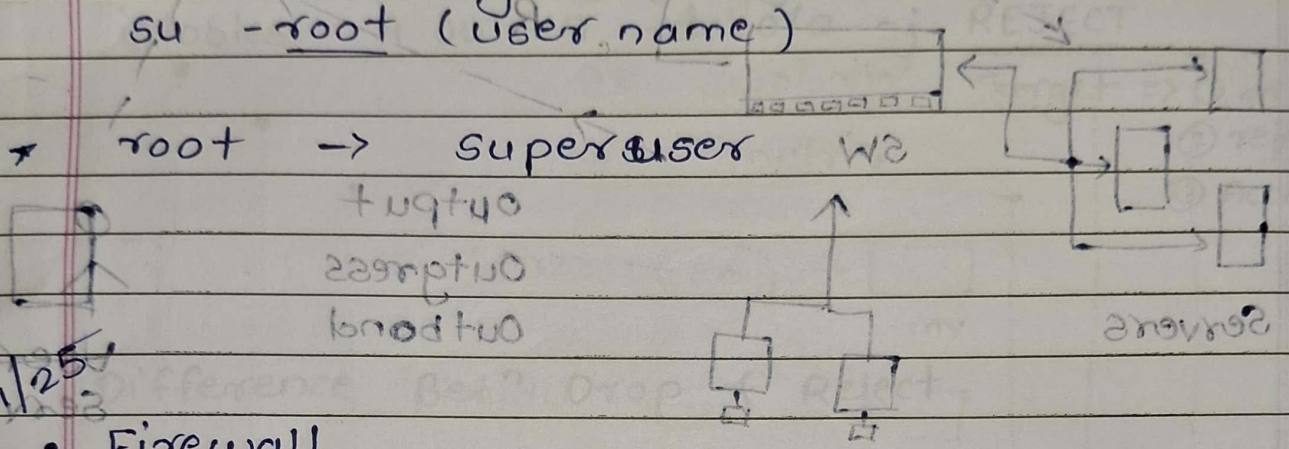
Linux slash => /

Window slaush => \

- How to show path ?
  pwd (print working directory)

- How to change User
  su -root (user name)

* root -> superuser



21/01/25

- Firewall

H/w Level -

① Juniper
② Fortigate
③ Cisco asa
④ checkpint
⑤ Sophos
⑥ Paloalto

iso Firewall -

① ~~pfsnese~~ pfsense
② Untangle
③ ipcop

s/w Level ( install inside OS / Linux / Windows)

① iptables
② Firewalld ---- rhel 7/8/9
③ nftables ---- rhel 8
④ ghostfw ---- Windows

Inbond / Input / Ingress

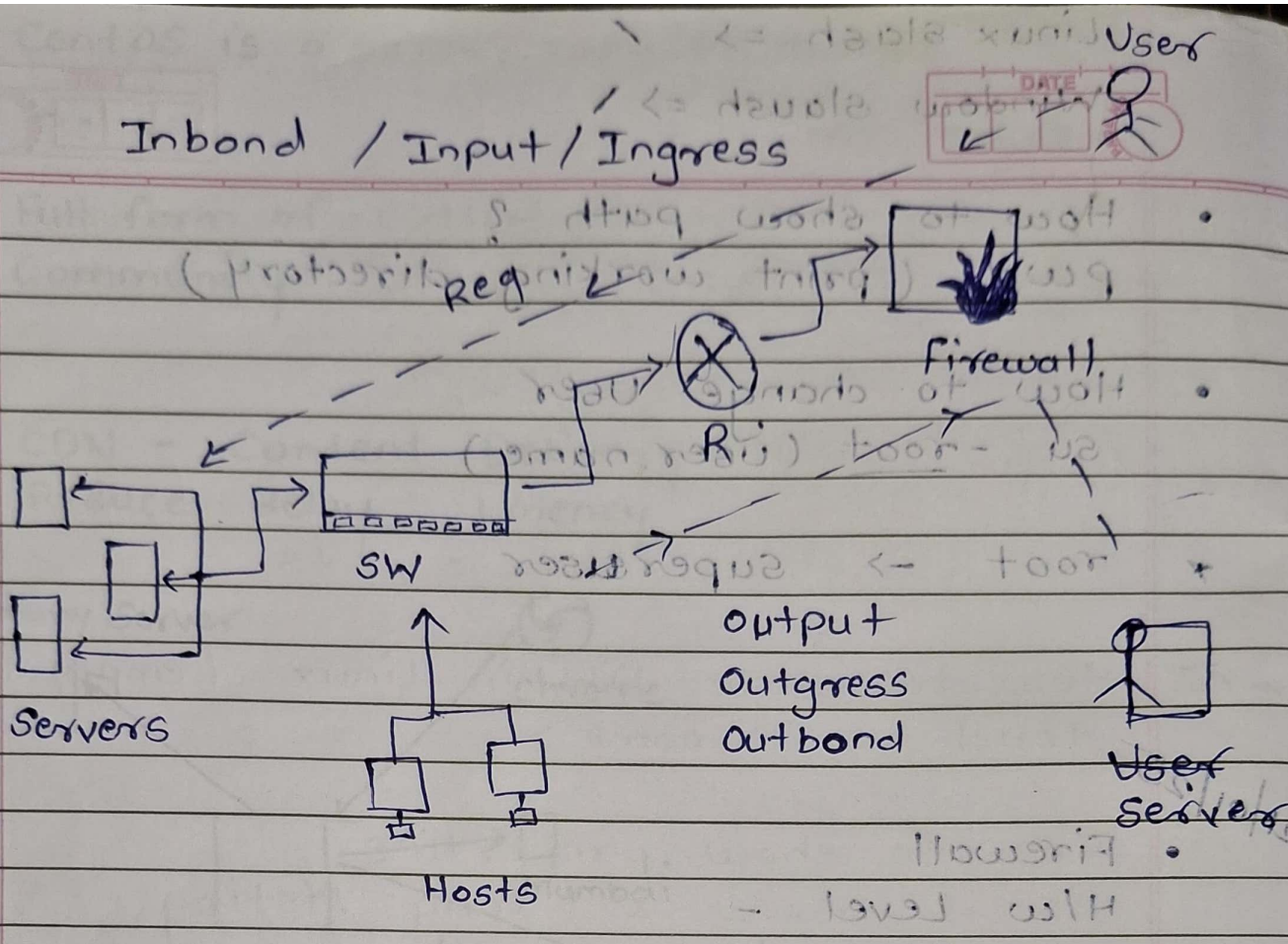



Fig., Firewall Working

★ Task

Reject all inputs / Block all incoming traffic

① How to check list

iptables -L

② Flush all rules

iptables -F

③ iptables -A INPUT -s 0/0 -j REJECT

Add source Jump

④ chkconfig iptables on

Firewall on CentOS

Automatically enabled firewall.

⑤ How to Reject particular ~~see~~ ip

iptables -A INPUT -s 192.168.118.142 -j REJECT

⑥ How to reject outgoing permission

iptables -A OUTPUT -d 0/0 -j REJECT

Target => ① drop
② reject
③ Accept

IMP Difference Bet? Drop & Reject;

-j => specify the target action

* Drop — silently discards the packet.

* Reject — Drops packets & sends an error response.

- How to start iptables ?
  service iptables start
- How to stop iptables ?
  service iptables stop
- How to check status of iptables ?
  service iptables status

# Virtualization

DATE 22/01/25

- Virtualization is a s/w / hypervisor which helps to run multiple O.S in a single base O.S.

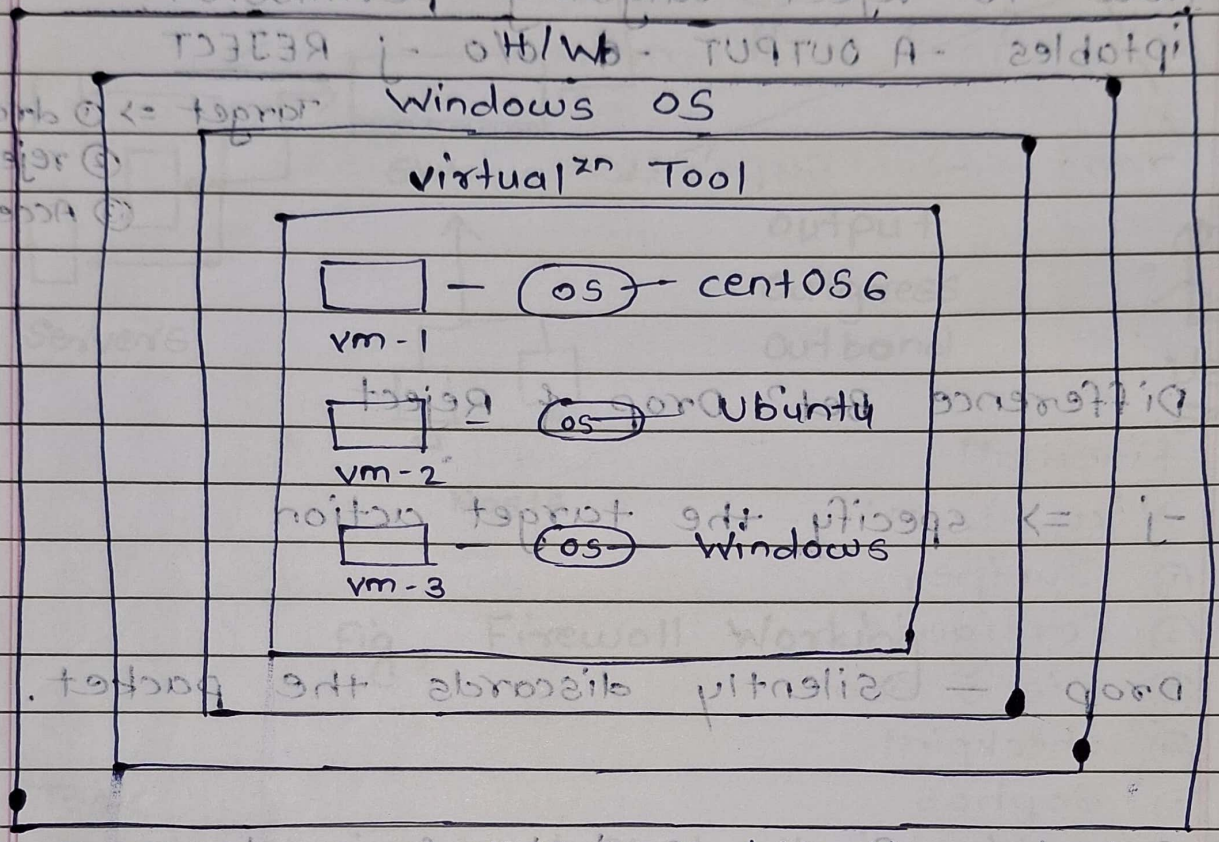



Fig., Virtual Architecture

★ Virtualizatn s/w –

1. vmware
2. Citrix zen
3. virtual box
4. Hyperv

IMP – Virtualization is a technology that transforms h/w into s/w.

- It allows to run multiple OS as virtual machines.

- Each copy of an OS is installed in to a virtual m/c.

- Firewall

(*) How to change policy permission.
iptables -P OUTPUT DROP
iptables -P INPUT DROP
iptables -P FORWARD DROP

(2) Reject All Inputs
iptables -A INPUT -S 0/0 -J REJECT
iptables -A INPUT -S 192.168.1.10 -J ACCEPT

(3) Reject input based on priority
iptables -A INPUT -S 0/0 -J REJECT
iptables -I INPUT -S 192.168.1.10 -J ACCEPT

-I ⇒ Insert (prioritize permission)

(4) How to set permission for multiple ~~inputs~~ o/p.
iptables -A OUTPUT -d 0/0 -m state -state ESTABLISHED -j ACCEPT

(5) Accept permission coming from SSH protocol.
iptables -A INPUT -S 0/0 -tcp -dport 22 -j ACCEPT
-p

23/01/25

Q. Difference Bet" Restart & Reload

Q. Why we use Kolkata time zone

★ Firewall

① How to check ~~Activated~~ firewall is active or not
firewall-cmd --state

② How to start ~~firewall~~
systemctl start firewalld

③ Reload command
firewall-cmd --reload

④ How to add services in firewall
firewall-cmd --permanent --add-service=ssh

⑤ Remove services
firewall-cmd --permanent --remove-service=ssh

⑥ (How to check all services
firewall-cmd --get-services

⑦ check firewall services
firewall-cmd --list-services

⑧ How to open port in firewall
firewall-cmd --add-port=2049/udp
firewall-cmd --reload

⑨ Find service (specific service)
firewall-cmd --get-services | grep -i dhcp

⑩ How to check list of ports?
firewall-cmd --list-ports

# Cat Command

DATE 27/01/25

## Linux Cmd

① How to open file
cat file_name

② How to create file using cat cmd.
cat > file_name

③ How to edit file
cat >> File_name

* ctr + D => save & exit

④ How to concadinate files?
cat filename filename

⑤ How to show line No.
cat -n File_name or File_name

⑥ Concatenate files & save result into new file.
cat file_name File_name > new_File.

28/01/25

| | | |
|---|---|---|
| ① | :wq | save & quit |
| | :q | quit |
| | :wq! | save & quit forcefully |
| | :q! | quit without save forcefully |
| | dd | delete the current line |
| | d5d | delete 5 lines |
| | yy | copy the current line (yanked) |
| | y5y | copy 5 lines |
| | p | paste |
| | u | undo |

ctr + r redo

* Search & Replace

/txt ---- search

:s/old/new --- replace word in current line

:%s/old/new/g ---- replace word whole file

:set nu ---- show line numbers

:set nonu ---- Hide line numbers

* Arrow keys

0 ----- moves to the begining of the line

$ ----- end of the line

gg ------ jump to the top of the file

G ---- end of the file

<number>G ---- jump specified line

i ------ insert mode for editing

esc ------ esc mode

:wq ---- save

* vi ---- editor

- edit File

- vi <file_name>

30/01/25

9. What is NAT

DATE 30/01/25

BIOS - Basic I/P O/P system (H/w info)

* Anaconda - is a program which heads linux installation which is responsible for the insll.

Anaconda present in iso files.

* SAN - NAS
Collection of files

* Linux Partition
- Linux install in single partition
- Linux install ---- > partition.

Selinux -> Security Enhance Linux

05/02/25

-rw-r--r--. 1 root root 0 Nov 25 19:53 File4

- File type
- selinux
- Permission
- Link count
- Owner
- Group
- File size
- Date & time
- Filename

★ rw- r-- r--

Owner Group Other

★ Types of files in Linux

① - → Regular file

② d → Directory

③ l → Symlink

④ b → Block File

⑤ c → character file

⑥ s → Socket

⑦ p → Pipe

★ Linux - 3s

→ 1. Security

2. Scalability

3. Stability

① How to create hidden files in Linux

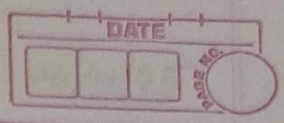
touch .file_name

② How to check hidden files in Linux.

ls - only hidden files see.

ls -a - All normal & hidden

1 → For File
2 → For Directory




③ How to add user in Linux
useradd user_name

④ How to check userid in Linux
id user_name

⑤ How to create user pass in Linux.
passwd user_name

⑥ How to change / create owner of file.
chown user_nm file_nm

⑦ How to check owner of file.
ls -l file_nm

⑧ How to set permission for owner in Linux.
chmod u + rwx File_nm

⑨ How to set permission for group
chmod g + rwx File_nm

⑩ How to set permission for others.
chmod o + rwx File_nm

⑪ How to set / change permission.
(all)
chmod u + rwx , g + rwx , o + rwx File_nm

⑫ How to delete user in file.
userdel user_nm

⑬ How to delete group in file.
groupdel group_nm

06/02/25

* How to remove permissions
chmod u-r filename
chmod a-r filename (for all)

* How to add group
groupadd <groupname>

* How to add users in groups
~~chmod~~ usermod -G <groupnm> <usernm>

* How to add multiple user in one cmd
gpasswd -M rohit, suraj, shivam lenovo

* How to change group of a file.
chgrp <groupnm> File_nm

How to delete a Folder with files.
rm -rf Folder_nm (forcefully)

# Special Permission (facl)

DATE 08/02/25

- ACL
  Special Permission Command

① How to set special permission for specific user.

```
setfacl -m u:user_nm:rwx file3
```

② How to set special permission for specific group.

```
setfacl -m g:group_nm:rwx file_nm
```

③ How to check permission.

```
getfacl file_nm
```

set - set
f - file
acl - Access Control List

④ How to remove special permission.

```
setfacl -x u:user_nm File_nm (user)
setfacl -x g:group_nm File_nm (group)
```

⑤ How to remove all special Permission.

```
setfacl -b File_nm
```

- **Octal Way ( permission Method )**

r = 4

w = 2

x = 1

Owner → rwx - 4+2+1 → 7

Group → rw - 4+2 → 6

Other → r - 4 → 4

① How to set permissions using octal way.

chmod 674 File_nm

↓ ↓ ↓

U G O

② Default permission of files.

Owner - rw-

group - r--

other - r--

③ How to remove all special permission

setfacl -b file_nm

DATE 11/02/25

# Advanced Permission : Suid, Sgid & Stickynote

owner — u+s
group — g+s
others — o+t

① How to set advanced permission.

chmod u+s file_nm
chmod g+s file_nm
chmod o+t file_nm

Suid → set permissions to all users
Sgid Suid is a set over a file all users can access root previledges command.

* /sbin → All root previledges

② How to give root previledge cmd to specific users.

visudo

* /etc/sudoers

③ How to write permission in visudo. (Specific Users)

# user_nm ALL = /sbin /fdisk

④ Remove Password

# user_nm ALL = /sbin / fdisk -l NOPASSWD : ALL

⑤ How to check if root privileges have been granted to a user

$user terminal → sudo fdisk -l

DATE 12/02/25

① What is SUDO (Super $User DO)
It is a way to temporarily grant a user administrative rights.

② /etc/sudoers
Defines who can run with special permissions like root.

③ sgid - set permission to all group.
If SGID is set over a directory multiple user can share same directory or file.

④ How to set SGID permission to group.
chmod g+s ~~group_nm~~ file_nm

⑤ Stickybit
If Stickybit permissionr is set over a file, only owner can be delete that file.

⑥ How to set stickybit.
chmod o+t file_nm

- Advanced Permission in octal way

suid → 4
sgid → 2
stickybit → 1

How to set advanced permission using octal way.

chmod 7777 file_nm
↓
Advanced permission

# UMASK

DATE 15/02/25

- umask

dir (full permission) ---r- 777
umask value <- ---r- 0033
744

744 => rwx r-- r--

Umask (usermask) <- set default permission.

Steps :
/ ] # umask 0033
/ ] # mkdir fol_nm
/ ] # ls -ld fold_nm

Eg.,

① umask 0022
dir 777
umask 0022
0755

755 => rwx r-x r-x

② umask 0027
750 => rwx r-x ---

③ umask 0777
000 => --- --- ---

④ umask 0000
777 => rwx rwx rwx

⑤ umask 0027
750 => rwx r-x ---

DATE 17/02/25

- Find Command
- Used to find specific file / dir.
- Find cmd in Linux used to search file / directories based on name, type, size, time, permissions & other attributes within a specified path.

Synopsis

find [path] [-options] [File & dir_nm]

find /home -name file11

cmd for

(1) How to ignore case sensitive in Linux ?

find /home -iname file11

↓
ignore

(2) How to find multiple files in one cmd ? *

find /home -iname file_nm -o -iname file_nm

↓ ↓
File_nm or

(3) How to find directories / file ?

find /home -type d (dir)

find /home -type f (file)

(4) How to find greater than 100MB files ?

find /home -size +100M

(5) How to find less than 100MB files ?

find /home -size -100M

* In Linux, MB → M

KB → k

GB → G

bytes → c

⑥ Find files using permission attribute?
find /home -perm 600

How to check files whose group is group_nm?

⑦ Find files using group attribute?
find /home -group group_nm

⑧ How to find empty files & delete them?
find /home -type f -empty -delete

⑨ How to checked files owned by ramu?
find /home -user ramu

⑩ How to check newer files after editing file3?
find /home -newer /home/file3

Last

★ Find cmd is an extremely powerful tool for searching files & directories in Linux.

★ . → used for current directory.

⑪ How to create multiple files?
touch file{1..10}

★ ls -lh => show in detailed info with file size.

⑫ How to search all the files which starts with letter a?
find /path/ -iname a*

⑬ How to search all the files whose size are bet^n 1-50 MB?
find /path/ -size +1M -size -50M

20/02/25

18/02/25

(14) How to search 15 days old files?

find /path/ -mtime 15

Modificat^n time

- Locate Command —

(1) How to find particular files?

locate file_nm

Locate : It is faster than find command. It work on database

Find : It is slow if work on real time.

(2) How to update database?

updatedb

(3) How to show top 5 files?

locate -n 5 '*.log'

(4) How to ignore case sensitive?

locate -i File_nm

(5) How to show existance of file without updating the file?

locate -e file_nm

DATE 24/02/25

# Grep Command

① How to search specific word in file?

grep "word" file_nm

② How to ignore case sensitive?

grep -i "word" file_nm

③ How to show number of specific word?

grep -in "word" file_nm

④ How to search specific word in root dir?

grep "word" /*

⑤ How to search specific file from large data?

ls | grep -i file_nm

^

Pipe (AND Concept)

* Define -

Grep command is used to search for text in files or command o/p.

# Storage Mgmt

## Hard Disk

DATE 25/02/25

* Case I

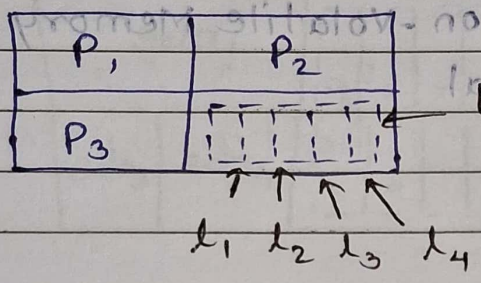
Hard Disk → 4 partition

* Case II

Two partition :-

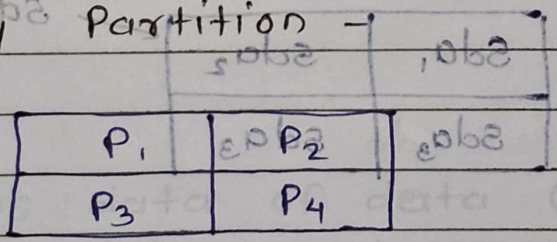
① ~~Par~~ Primary Partition

② Extended Partition -

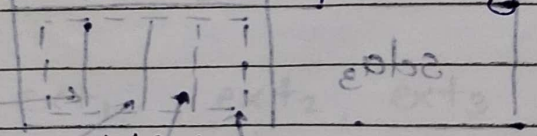



( Logical Partitions )

① Primary Partition -




* If you need more than four partition, you must create an extended partition, which acts as a container for multiple logical partition.



Two Types of Harddisk -

HDD

hdd + ssd

hdd Harddisk Type –

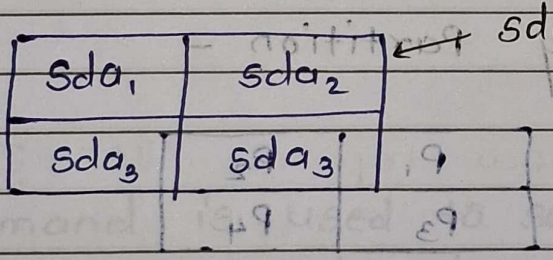
① Aata
② Pata ( Parallel Advanced Technology Attachment)
③ Sata ( Serial ——— )
④ scsi ( simple computer system Interface )

ssd Harddisk Type –

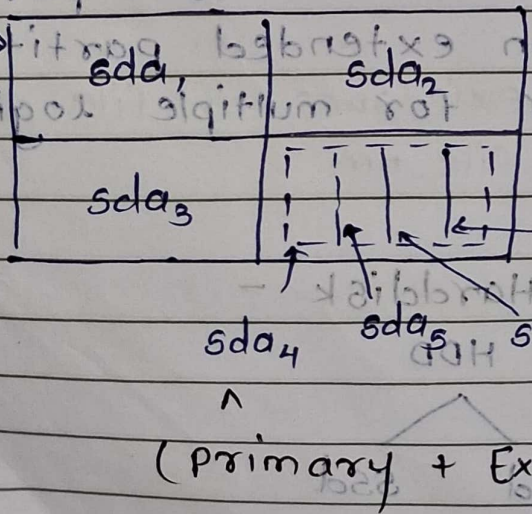
① ssd 2.5
② ssd M.2
③ ssd NVME (Non-Volatile Memory Express)
④ ssd Intel optical

- Driver

sda, sdb ... are the multiple driver to assign multiple single harddisk.




★ Case III

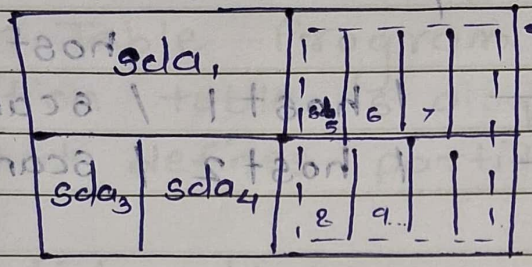



(primary + Extended)

* $sda_4$ is doesn't used for partitioning. It is a ~~Layer~~ type of Layer.

* Case IV

In Single Harddisk, only one partition we make a primary + Extended partition.

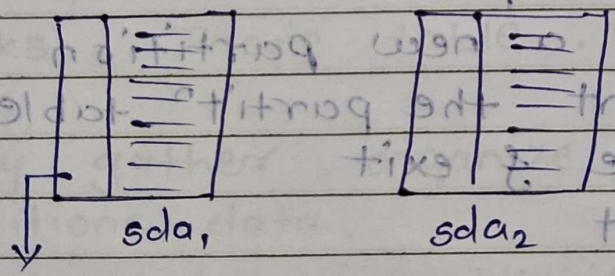



- Primary partitions are reserved.
Primary + Extented partition named as $sda_5$, $sda_6$, $sda_7$, ...

* Case V

Index :-

Index means data of data (Metadata).




File system - $ext_1$, $ext_2$, $ext_3$, XFS, RaiserFS.

- Each partition have their own index.

DATE 28/02/25

① How to add hardisk in Linux?

Steps : ① VM tab
② settings
③ Add hdd
④ Nxt → specify disk capacity
⑤ OK

② How to discover Hardisk?

echo "---" > /sys /class /scsi_host /host0 / scan
— " — / host1 / scan
— " — / host2 / scan

③ How to check created hdd?

reboot
lsblk OR ls /dev / sd * OR fdisk -l

* fdisk /dev /sda

d → delete partition
n → add a new partition
p → print the partitⁿ table
w → save & exit
q → exit

• IOPS ( Input / Output Per second )

HDD → 200 IOPS
SSD → 1L IOPS

01/03/25

- Filesystem

FS Types - ① ext2
② ext3
③ ext4
④ XFS
⑤ IFS
⑥ RaiserFS
⑦ cifs
⑧ ntfs
⑨ hdfs
⑩ btrfs

- Partitions Table Program -
- A partition table is a program on a storage device that defines partitions layout.
- Each hardisk will have 1 partition table program

- What is File system ?

Purpose - To organize / control & manage the data.

- File system contain Inodes, Superblocks, Blocks, Inode table, Mount Info.

- They gather, organize & controls the specific partitions data.

① How to delete data permentaly ?
shred → Linux

In Windows, do low level format tools.

② Inode Number ?

- inode number is unique ~~AU~~ unique number for each file / folder.
- inode number contain ownership, size, accesstime, mtime, ctime
- inode number contain metadata

★ Data Recovery Tool -

① recova
② stellar
③ testdisk

★ Low-level Format Tool

① For Linux / Window
   i) MHDD
   ii) SEA Tools
   iii) IBM / HGST
   iv) HDPARM

② Android
   i) SP FLASH Tool
   ii) ODIN - SAMSUNG official tool
   iii) MI FLASH TOOL
   iv) FASTBOOT

③ Iphones -
   i) Itun
   ii) 3utools

③ How to show inode number?

ls -i

④ How to show particular file inode number?

ls -i file_nm

★ Format – To recreate file system.

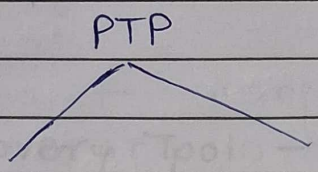
DATE 03/03/25

① How many logical partitions can be created?

60 partition - Total

56 partition - logical

- Partition Table Program -




128 - primary

MsDos (MBR)

4 - ~~logical~~ primary

56 - logical

gpt

② How to show partition table program in Linux?

parted -l

For specific, parted /dev/sdb print

* Kernel Panic Mode = Maintainance Mode.

* sda is a default driver

04/03/25

- Mounting –

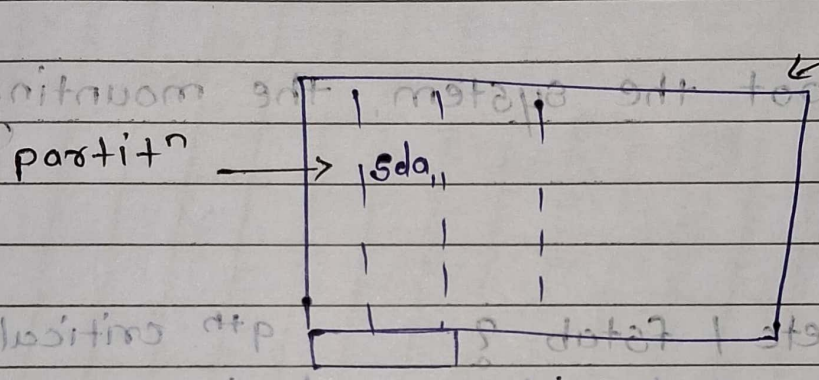
The mount command in Linux is used to mount / attach drivers / partitions to a directory, so they can be accessed.

Synopsis :

mount DEVICE MOUNT_POINT

DEVICE → The storage device or partitⁿ.

MOUNT_POINT → The directory.




STEPS : Temporary Mounting

① Make partition

fdisk /dev/sdb

② Create a Mount Point (directory)

mkdir dict_name

③ Update kernel table

partx /dev/sdb

④ Assign File System

mkfs.ext4 /dev/sdb1

⑤ Mount the partition

mount /dev/sdb1 /dict_name

⑤ Verify the Mounting
df -h
Print it Mounted File system

⑥ Unmount the partition
umount /dir_nm
OR
umount /dev/sdb1

* If you reboot the system, the mounting will be lost.

• What is /etc/fstab ? → 9th critical file.
It ensures that storage devices are automatically mounted at boot.

STEPS : Permanent Mounting

① Edit the /etc/fstab file.
vi /etc/fstab

② Add a new line at the bottom in this format :

/dev/sdb1 /dir_nm ext4 defaults 0 0

③ run cmd: mount -a
If there are syntax error, mount -a will show them before rebooting.

06/03/25

- Take snapshot of VM (backup)

steps :

1. Right click on VM name
2. click on snapshot
3. click -> Take snapshot

06/03

- How to delete HDD in Linux?

```
echo 1 > /sys/block/sdX/device/delete
```

# LVM (Logical Volume Manager)

DATE 17/03/25

- How to create LVM Partition?

Steps :

1. Add hardisk
2. Discover hardisk
3. Create primary partition
4. chang id - 8e
5. Update kernel table
   partx -a /dev/sda
6. * Create Physical Volume
   pvcreate /dev/sda1
7. * Create volume group -
   vgcreate myvg /dev/sda1
   (vg name)
8. * Create logical volume -
   lvcreate -L +1G -n lv1 myvg
   - +1G → Storage
   - lv1 → lv name
   - myvg → vg name
9. Assign filesystem mkfs.ext4 /dev/vgnm/lvnm
10. Create mount point
11. Mounting partition.

* Primary Partition can't be extend & Reduce.

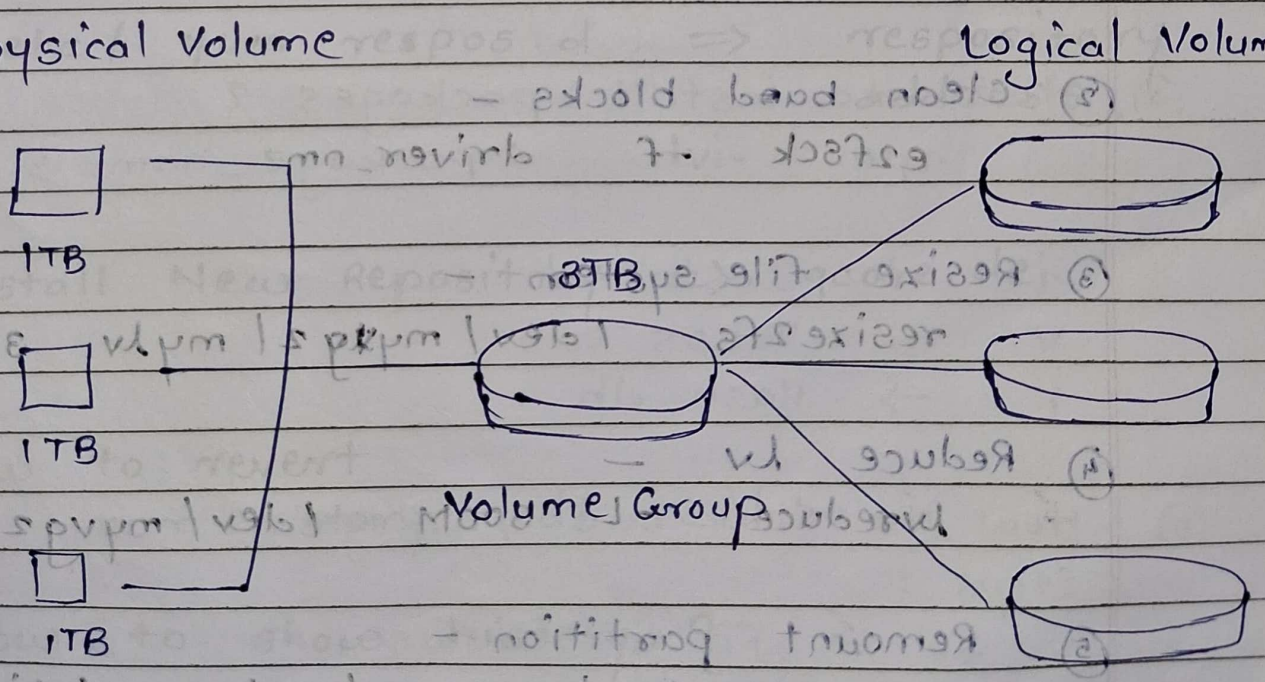
- How to check physical volume ?
  pvdisplay

- How to check volume group ?
  vgdisplay

- How to check Logical volume ?
  Lvdisplay

- What is LVM ?
  Logical Volume Manager is a tool to manage partitions.

  Using LVM we can increase or decrease partition space logically.



19/03/25

① How to extend logical partition ?

lvextend -L +100M /dev/myvg/mylv

↓

driver name

② How to resize Filesystem ?

resize2fs /dev/myvg/mylv

↓

driver_nm

20/03/25

How to reduce logical partition ?

Steps :

① Unmount the partition -

umount /dir_nm

② Clean bad blocks -

e2fsck -f driver_nm

③ Resize file system -

resize2fs /dev/myvg2/mylv 300M

④ Reduce lv -

lvreduce -L -300M /dev/myvg2/mylv

⑤ Remount partition -

mount /dev/myvg2/mylv /dir_nm

# YUM CMD

DATE 25/03/25

① yum list installed

② Install particular service
yum install httpd -y

③ search particular installed package
yum search httpd

④ show package information
yum info httpd

⑤ show particular package from ~~large~~ list of packages?
yum list installed | grep -i httpd

* /var/lib/rpm => packages

/etc/yum.repos.d => respository address.

* Install New Repository

How to revert
yum history undo <id>

How to show history?
yum history

DATE 27/03/25

- rpm ( RedHat Package Manager )

① List all packages -
rpm -qa

② How to check specific packages ?
rpm -qa | grep -i <package_name>

③ How to installed packages ?
Steps :
① df -h
② Copy media path : /run/media/root/
CentOS 7 x86_64
③ ls -> Packages directory

- Packages - Local Repository
.rpm -> Already downloaded Packages

④ How to install packages ?
rpm -ivh <package_name>

i -> Installed
v -> vebos
h -> Hash db

⑤ How to download packages ?
Steps :
① Go to Firefox Browser
② rpm.pbone.net
③ Advanced RPM search > click
④ check CentOS version.

⑤ search package

⑥ select version & copy link

⑦ Install package : rpm -ivh <package>

④ Download package : wget <package_link>

⑥ Check Packages are Installed or not?

rpm ~~-ivh~~ ~~-sh~~ -qa | grep -i <package>

(if package are installed then package have no rpm extension.)

# File Compression

DATE 08/04/25

Tar Command -
Collection of Different files.

Archieve :
Combining multiple files / directories into one file.

① Create tar Archive -
tar -cvf <file.tar> file1, file2 file3 ...

② How do you show tar list ?
tar -tvf file.tar

③ How do you extract .tar file ?
tar -xvf file.tar

④ How do you compress file using gzip ?
gzip < file_tar >

create &
⑤ How do you compress file in one command?
tar -czvf < file.tar.gz > file{1..3}

⑥ How do you extract the the gzip file?
tar -xzvf < file.tar.gz >

⑦ How do you list the gzip file ?
tar -tzvf < file.tar.gz >

bgip ( Bun zip ) -

Advanced version of gzip which compress file more tiny.

① How do you create & compress file in one command..?

tar -cjvf <file.tar.bz2> file1 file2...

② How do you list the bzip file?

tar -tjvf <file.tar.bz2>

③ How do you extract the bzip file?

tar -xjvf <file.tar.bz2>

- Zip —
  It is an tool to handle archieve & compression task.

① How do you zip file?
zip < file.zip > file {1..5}

② How do you unzip file?
<unzip < file.zip >

# Process & Daemons

DATE 18/04/25

① What is Process ?
Anything in the ram called Process.
OR
Program loaded in the ram called process.

② How do you show all process ?

* PID ( Process ID ) - Unique ID.

PID - 0 - Kernel Swap
PID - 1 - INIT ( centOS 6 )
SYSTEMD ( centOS 7, 8 ... )

③ How do you check PID of Particular process ?
pidof <process_name>

④ How do you kill a particular Process ?
kill <pid>

⑤ How do you count a running processes ?
wc -l

* pid 0 --- Kernel Swapper --- Kernel Schedular

Kernel program control all processes.

⑥ How do show processes in a tree-like format ?
pstree

(7) How do you show current terminal PID?

ps

(8) How do you kill forcefully any process?

kill -9 <pid>

(9) What is Load?

Process waiting in a queue is called Load.

- top -
top command show active & page fit process.

/proc -
top collects & gather info from /proc.
/home - Data of Hardisk.

① How do you check load in Linux system?
top

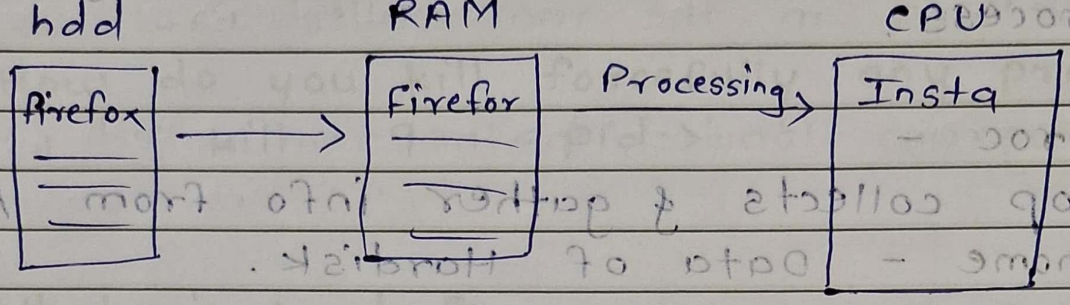
② How do you show uptime?
top
uptime
cat /proc/uptime (imp)

load average : 0.08, 0.03, 0.01
1min 5min 15 min

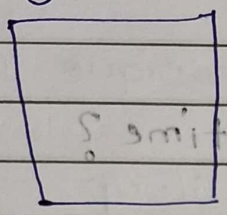
- Sar command — show data upto 30 days

DATE 19/04/25 PAGE NO.

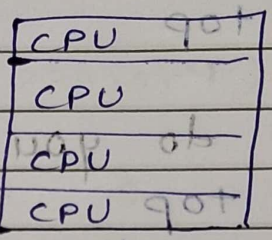
Core –




Single Core



Multi Core




D → Single core

① How do you show cpu info ?

cat /proc/cpuinfo | less

OR

lscpu

★ Zombie –

Dead Process waiting to kill by parent is called zombie.

A process that has finish executing but still remains in the process table is called zombie process.

This happens when the parent process don't read the child process exit status.

# Top Command Summary :

① System Info —

eg.,

12 : 34 : 56 — Current system time.

up 2 days, 3:22 — How long the system has been running.

2 users — No. of users currently logged in.

load average : 0.45, 0.50, 0.60 — How busy the CPU is in the last 1, 5 & 15 min.

② Tasks Line —

eg.,

230 total — Total number of processes.

1 running — Actively using the CPU.

229 sleeping — These are waiting or not doing anything.

0 stop — Manually stopped process.

0 zombie — Dead process waiting to kill by parent.

③ CPU Usage —

us (user) - Time spent on user processes.

sy (system) - Time spent on kernel (system) processes.

ni (nice) - Time spent on nice priority processes.

★ Nice Value —

Niceness scale goes from -20 to 19.

-20 - Highest Priority (get more CPU time)

0 - Normal priority.

+19 - Lowest priority (get less CPU time)

Syntax :

nice -n <nice_value> <proc_name>

Nice command helps to decide who gets more attention from the CPU.

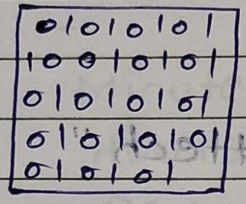
id (idle) - CPU is doing noting.

wa (wait) - Waiting for disk or data.

DATE 21/04/25

* Fork Bombing —

RAM



This cmd write 0101...

"data" on ram.

Define —

Fork Bombing is when a small program keeps creating copies of itself very fast, which can slow down or crash the system.

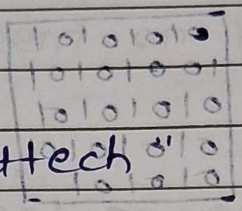
DATE 22/04/25

# Shell Scripting

#!/bin/bash ÷÷÷ shebang value

eg., script.sh

```
echo "Hello, Word"
echo " Welcome to Nettech
```



```
touch /xyz
touch /abc
groupadd nettech
mkdir /opt/myfld
top
ps
fdisk -l
```

① How do you run script ?

① ./script.sh

② script path --- /etc/script.sh

③ bash /etc/script.sh
sh

② How to execute script in debbuging mode ?

bash -x [script.sh]

- cronjobs

crontab -e — schedule task

Fields —

* - Minutes (0 - 59)
* - Hours (0 - 23)
* - Day of Month (1 - 31)
* - Month (1 - 12)
* - Day of week (0 - 7)
[Sunday -> 0 or 7)

① What is crone Job ?
Cron Job is a scheduled task that allows you to run scripts or commands at specified intervals.

② How to edit crontab ?
crontab -e

③ How to view your current cron jobs ?
crontab -l

④ How to delete cronjobs ?
crontab -r

eg.,
Edit crontab —

* * * * * /user/sbin/fdisk -l > /cron.txt

every 1 min — fdisk path — Redirect the output

24/04/25

① How to test / check condition ?

① test 5 -lt 5

v

less than equal to

② test 5 -gt 4

v

greater than

② Test condition using operators ?

① && (AND) -

test 5 -gt 6 && echo true

② || (OR) -

test 5 -gt 4 || echo true

OR

[ 5 -gt 4 ] && echo true

* [ 5 -gt 4 ] && echo true || echo false
cond^n is true then print true either false.

★ Variable which contains value.

Steps

① A = choclate

② echo $A

# SSH - Remote Access

DATE 29/04/25

~~How to re-read the file?~~

① How to check service status ?
systemctl status sshd

② How to check ip address in Linux?
ip r l

③ How to give remote access ?
ssh user@<ip_add> ~~<service_name>~~

④ Install new service & start —
i) yum install <service> -y
ii) systemctl start <service>
iii) systemctl status <service>

⑤ Steps For secure Remote Access —
* Client side
i) ping google.com
check connectivity.
ii) ssh username@ip-addr
Give remote access.
iii) Type "yes" => Enter server side pass.
iv) exit => logout

* Server side

i) ping google.com
check connectivity

ii) yum search service_name
check if the service is Installed.

iii) yum install service_name -y
If the service is not installed, then install using yum cmd.

iv) systemctl start sshd
Start service.

v) vi /etc/ssh/sshd_config
Edit config file to giving root access.

vi) PermitRootLogin yes

vii) systemctl restart sshd
Restart ssh service.

viii) ip r l OR ifconfig
check the system ip address.

- How to check port from server side?
  netstat -tulnp
- How to check running port from client side?
  telnet <ip_add> <port_no>

DATE

* If SSH is not working, then add the SSH service to the firewall.

① How to check all services in firewall?
firewall-cmd --get-services

② How to add particular service in firewall?
firewall-cmd --permanent --add-service=service_name

③ How to Reload firewall?
firewall-cmd --reload

④ List all services ?
firewall-cmd --list-services

# Network Troubleshooting

06/05/25

- Troubleshoot static ip

Steps :

1. check IP & Gateway on Windows
   ipconfig
2. set Ethernet Adapter to Bridge mode in VM
3. Configure Network -
   To assign a static IP add. to your Linux m/c instead of DHCP.
   N/w configuration File
   vi /etc/sysconfig/network-scripts/ifcfg-eth0
4. Edit Conf. file :
   DEVICE = eth0
   BOOTPROTO = static
   ONBOOT = yes
   IPADDR = 192.168.1.20
   NETMASK = 255.255.255.0
   GATEWAY = 192.168.1.1
   DNS1 = 8.8.8.8
   DNS2 = 8.8.4.4
5. Configure DNS Resolution
   vi /etc/resolv.conf

   Add this line : nameserver 8.8.8.8
6. Stop Network Manager
   service NetworkManager stop

PING -> Packet Internet Groper

⑦ Restart Network service

service network restart

⑧ Verify Connectivity

Test 1 - Ping the Gateway

ping 192.168.1.1

Test 2 - Ping an external DNS

ping 8.8.8.8

Test 3 - Ping a domain

ping google.com

DATE 08/05/25

# NFS - Network File System

NFS is nlw protocol that allows computer to share files & directories over a nlw.

NFS does not execute or install slw over the nlw by itself.

NFS setup steps - server side

1. check or Install NFS Utilities
   rpm -qa | grep -i nfs-server.service
2. start NFS service
   systemctl start nfs-server.service
3. start NFS dependency : rpcbind
   systemctl start rpcbind
4. verify NFS Port (2049) is Listening
   netstat -tulnp | grep -i 2049
5. Configure exports file
   vi /etc/exports
6. Add the following Line -
   /dic_name * (rw, sync)
   ↓
   (all available nlw)
7. Apply exports configuration
   exportfs -rv
8. check server ip - ip r l
9. Disable Firewall
   systemctl stop firewalld

client side

① Test connectivity
ping <server_ip>

② Verify NFS port is listening
telnet <server_ip> 2049

③ View NFS shares from server
showmount -e <server_ip>

④ Create Mount directory
mkdir <dic_nm>

⑤ Mount the NFS share
mount <server_ip>:/dic_s /dic_c

* Troubleshooting —

set permission (server side) —

chmod 777 /etc/exports
chmod 777 /resume
systemctl restart nfs-server.service

set Permission (client side) —
chmod 777 /local

Difference Bet$^n$ client & server

| client | server |
|---|---|
| (1) Utilize services or resources | Provides services or resources |
| (2) It cannot work without a server | It can work & serve many clients. |
| (3) Always initiates communication | wait for client request. |

- How to change Hostname ?

```
hostnamectl set-hostname client.com
```

14/05/25

# Database

## Database

DBMS — excel, Word

RDBMS (Relational DB Mgmt System)

- SQL
  - Oracle
  - mysql
  - Postgress
  - db2
  - rds (AWS)
- NoSQL
  - MongoDB
  - DocumentDB
  - RevenDB
  - DynamoDB (AWS)

① Difference Betⁿ SQL vs NoSQL

| | SQL | NoSQL |
|---|---|---|
| ① | Structured DB | Unstructured DB |
| ② | It includes rows, columns, tables | Doesn't include rows, columns, tables. |
| ③ | It is schema based. | No schema based. |
| ④ | ex., oracle, mysql, postgress, rds. | eg., Mongodb, Documentdb, RevenDB |
| ⑤ | Average speed | very good in speed. |
| ⑥ | Handle complex querries | Doesn't handle comple |
| ⑦ | vertical scaling | Horizontal scalling |

② How to open port in Linux ?

systemctl start <service_name>

③ What is the meaning of this command :

systemctl enable <service>

If service is enable then service will automatically start every time you reboot the system.

④ Where is the created database stored ?

/var/lib/mysql

- Mysql —

- Update version :- Mariadb
- Both are Relational DB

| | |
|---|---|
| ① Paid | Free |
| ② Used for enterprise | Used for community. |

- Configuration file of mysql ?

/etc/my.cnf

How to Install MySQL (MariaDB) ?

yum install mariadb -y

- show, create, Insert

Steps :

① Install mariadb & mariadb-server

yum install mariadb-server -y

② Start Mariadb service

systemctl start mariadb

③ How do I enter the db ?

mysql

④ If I can enter using a username, how should I write it ?

mysql -u <user_nm> -p

⑤ How to show databases ?

show databases ;

⑥ Create database –

create database <db_name> ;

⑦ How to use database –

use <db_nm> ;

⑧ How to create table ?

create table <table_name> (name char(20), department char(15), age int(15));

(9) How to describe table format ?

desc <table_name>;

(10) How to insert values in table ?

INSERT INTO <table_name> VALUES ('Siddhi', 'AC', '20');

(11) How to show table values ?

SELECT * FROM <table_name>;

(12) How to exit from db ?

quit

(13) How to show tables ?

show tables;

# FTP - File Transfer Protocol

20/05/25

① How to show all dependencies ?
rpm -qR <service_name>

② How to show configuration file path of particular service ?
rpm -qc <service_name>

③ How to Install all dependencies ?
sy yum install vsftpd* -y

- /var/ftp → default directory used by FTP server to store files accessible to anonymous users. (public)

- Types of FTP -
  ① vsftpd - very secure ftp
  ② proftpd
  ③ filezilla
  ④ sftp - secure ftp

- FTP clients -
  ① browser
  ② ftp command line
  ③ lftp
  ④ kasabalansa
  ⑤ filezilla
  ⑥ gftp

SELinux (Security Enhanced Linux).

selinux - provide security

/etc/selinux/config → disabled selinux

- How to disabled selinux?

/etc/selinux/config

OR

#setenforce 0

# getenforce

#- systemctl reboot

# Anonymous Login

Server side

steps

① Check if service is installed
rpm -qa | grep -i vsftpd

② Install service
yum install vsftpd*

③ Start service
systemctl start vsftpd.service

④ Stop firewall
systemctl stop firewalld

⑤ check if the port is open.
netstat -tulnp | grep -i 21
netstat -tulnp | grep -i 22

⑥ Edit config file
vi /etc/vsftpd/vsftpd.conf

Edit Line - anonymous_enable=YES

× ⑦ Create file / directory in user home.
mkdir dirname (/home/user)

⑧ Restart vsftpd service.
systemctl restart vsftpd.service

Client side - If anonymous login is enabled then anyone can connect to your FTP server without a username or password.

# User Login

1] Client side ( Browser )

① Go to the client Browser
ftp://<server_ip>

② Enter user name & password

③ Dowload File
wget <File_path>

2] Client side ( Command-Line )

① Start service
systemctl start vsftpd.service

② check if port is listening
telnet <server_ip> 21

③ connect to ftp server
ftp <server_ip>

④ Enter username & password

output :
Login successful.
Remote system type is UNIX.
using binary mode to transfer file.

Server side —

Steps

① Start service
systemctl start vsftpd.service

② Go to the user home directory.
cd /home/user_nm

③ Create File / directory.
mkdir dic_nm

④ Restart vsftpd service
systemctl restart vsftpd

⑤ check ip
ip r l

# Root Login

Server side —

① Go to the /etc/vsftpd/ directory.
cd /etc/vsftpd/

② Edit ftpusers & user_list file
vi ftpusers
vi user_list

* Users listed in the ftpusers & user_list files are denied FTP access.

* Remove root from both files to grant FTP access to the root user.

③ Create dir or file

④ Restart service
systemctl restart vsftpd.service.

# FTP Terminal

① How to transfer file ?

put <file_name>

② How to transfer multiple files ?

mput <file 1> <file 2>

③ How to download file ?

get <file_name>

# Samba

DATE 22/05/25

- Samba —
  - Hetrogenos
  - Samba work on Linux to Linux and Linux to Window.
  - It is a file sharing protocol.
  - Not allow ananonymous login

Two services — ① smb (server msg block)

② nmb (netbios)

Port No. — 137 → nmb, 139 → smb, 445 → sharing

* In FTP or NFS are all linux user is FTP or NFS user.
  In Samba, all ~~use~~ linux user is not a samba user.

① How to check conf file errors?
  testparm

# Linux - to - Window

★ Server - Side

Steps

① Install service

```
yum install samba -*
```

② Start services

```
systemctl start smb
systemctl start nmb
```

③ Stop Firewall

```
Systemctl stop firewalld
```

④ Edit configuration file

```
vi /etc/samba/smb.conf
```

⑤ Edit File :

```
['share']
path = /path/
```

⑥ Create samba user

```
smbpasswd -a <user_nm>
```

⑦ Restart service

```
systemctl restart nmb
systemctl restart smb
```

⑧ check ip

```
ip r l
```

★ client side

```
\\ < server_ip >
```

Troubleshoot —

① Edit config file :

```
[share]
path = /path/
read only = no
writeable = yes
```

② Give Full permission

```
chmod a+rwx /path/to/file
```

IMP ③ change SELinux security setting for samba shared directory in case SELinux is enabled.

```
chcon -t samba_share_t /file/path/
```

Either change the SELinux setting to disabled.

# Linux - to - Linux

steps — (client side)

① Install samba packages
```
yum install cifs-utils samba-client -y
```

② Create a mount point
```
mkdir <dir-name>
```

③ Mount the samba directory
```
mount -t cifs //<serve-ip>/share /dir/path/
```
↓
File system

# MongoDB

28/05/25

Mongodb port Number :- 27017

① How to install mongodb in Linux ?

Steps -

```
# cd /etc/yum.repos.d/
# touch mongo.repo
# vi mongo.repo
```

Copy online mongo repository into the mongo.repo file.

Steps -

① Start service

```
systemctl start mongod
```

② Enabled Mongodb service

```
systemctl enabled mongod
```

③ Check status

```
systemctl status mongod
```

④ mongodb configuration file -

```
vi /etc/mongod.conf
```

⑤ How to access mongodb shell ?

```
mongosh
```

① Configuration file of mongodb
: /etc/ mongod.conf

② Where all database store ?
/var/ lib/ mongo

* Mongodb cmd —

① How to show all databases ?
show dbs

create &
② How to switch into a new database ?
use <db_name>

③ How to show collections in the current database ?
show collections

④ How to create a collection ?
db.createCollection ("myCollection")

⑤ How to insert a single document ?
db.<collect^n_name>.insertOne ({ name: "Alice", age : " 30 " })

⑥ How to insert multiple document ?
db.<collect^n_name>.insertMany ([{ name: "Bob", age: 25 }, { name: "charlie", age: 35 }])

⑦ How to delete a single document?

```
db.mycollection.deleteOne({name: "charlie"})
```

⑧ How to replace a document?

```
db.myCollection.replaceOne({ name: "Bob" },
{ name: "Bob", age: 28, status: "updated"})
```

⑨ How to show all documents from a collection?

```
db.<collectionName>.find()
```

# Ansible with SSH - passwordless

DATE 29/05/25

Local M/c —

steps

① Install Ansible

```
yum install -y python3 python3-pip
yum install epel-release -y
```

② ```
yum install ansible -y
```

② Edit configuration file

```
vi /etc/ansible/hosts
```

Add line :

```
[webserver]
<server_ip>
<server_ip>
```

③ ssh passwordless —

```
ssh-keygen
ssh-copy-id <user_name>@<server_ip>
```

④ Check ping with servers

```
ansible all -m ping
```

⑤ Create yaml script

```
vi <yaml_file_name>
```

⑥ Start playbook

```
ansible-playbook install.yml
```
```

Server Machine –

steps

① check connectivity
ping google.com

② start ssh service & enabled it
systemctl start sshd
systemctl enable sshd

③ Stop Firewall
systemctl stop firewalld

④ Edit ssh configuration file
vi /etc/ssh/sshd_config

Edit line - permitRootLogin =yes

⑤ check ip
ip r l

DATE 06/06/25

- Maintainance Mode Troubleshooting

How to troubleshoot a wrong entry in /etc/fstab ?

① Maintenance - shell available (root shell)

② Enter root password

③ Edit wrong entry in /etc/fstab.

④ reboot

- Kernel Panic Mode Troubleshooting

How to troubleshoot a wrong entry in /etc/grub.conf ?

① Kernel panic - no shell

② reboot

③ Map iso file

④ Go to BIOS → boot → cd-rom (top)

⑤ save & exit

⑥ Go to rescue mode - shell

⑦ chroot /mnt/sysimage
(you're inside your system & can repair it)

⑧ exit

⑨ exit